Cork City Council

Cork Docklands North and South Quays Maritime Usage Licence Application

Attachment 4.4 Risk Assessment for Annex IV Species

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List of Acronyms/ Glossary

AA	Appropriate Assessment
AOI	Area of Interest
DAHG	Department of Art, Heritage and the Gaeltacht
EC	European Community
EIA	Environmental Impact Assessment
EU	European Union
GPS	Global Positioning System
Ha	Hectares
HWM	High Water Mark
IUCN	International Union for Conservation of Nature
IWDG	Irish Whale and Dolphin Group
JNCC	Joint Nature Conservation Committee
MARA	Maritime Area Regulatory Authority
MUL	Maritime Usage Licence
NBDC	National Biodiversity Data Centre
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Services
PSA	Particle Size Analysis
QI	Qualifying Interest
RIB	Rigid inflatable boat
SAC	Special Area of Conservation
SCANS	Small Cetaceans in the European Atlantic and North Sea
SCI	Special Conservation Interest
SPA	Special Protection Area
UK	United Kingdom

1. Introduction

1.1. Background

This report has been prepared by AQUAFACT – APEM Group to provide information to inform the Annex IV Risk Assessment in support of a Maritime Usage Licence (MUL) application for site investigation surveys within the River Lee, Cork City. The proposed surveys are required to inform the design, engineering assessment and environmental assessment of the Cork Docklands South Quays Project and associated structural survey works within the Cork North Quays area. The South Quays project forms part of the wider regeneration of Cork Docklands and includes quay wall repair and upgrade works, public realm enhancement, improved connectivity, and related flood defence and public safety measures, while the North Quays survey scope comprises structural investigations at Horgan's Quay, the Turning Basin and North Deep-Water Quay.

The proposed Maritime Usage Licence application relates solely to temporary marine and intertidal site investigation surveys and does not authorise construction or permanent works. The South Quays survey scope includes ecological, archaeological and structural surveys, whereas the North Quays scope comprises structural survey works only. No additional ecological or archaeological surveys are proposed in the North Quays area as part of this MUL application.

The proposed survey programme has been designed to provide proportionate baseline environmental, archaeological and engineering information necessary to inform the design process and to support future Environmental Impact Assessment and Appropriate Assessment documentation, where required. The MUL application area extends within the River Lee, Cork City, and encompasses the South Quays survey area together with the North Quays structural survey locations within a single application area, as shown in **Figure 1-1**.

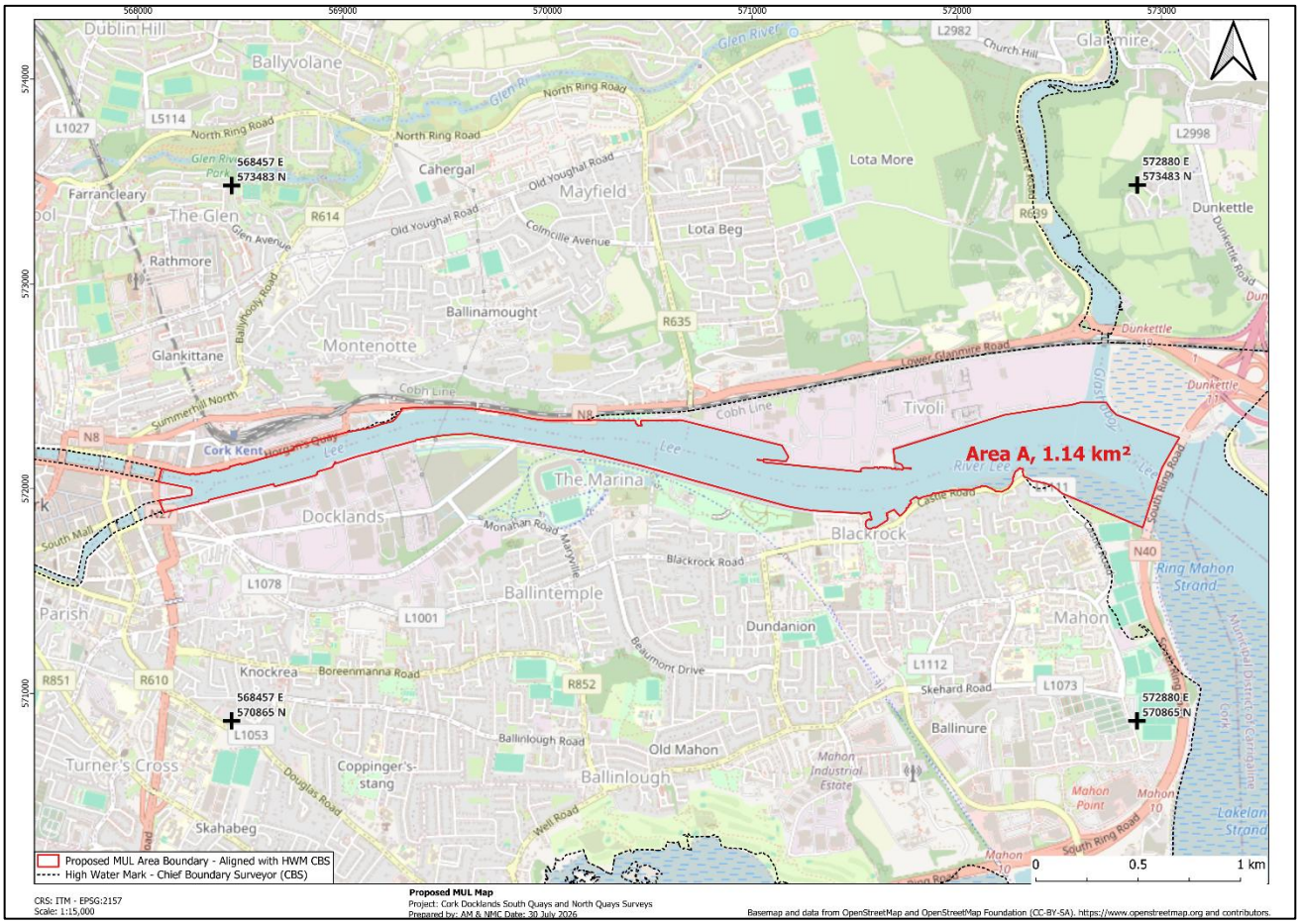

Figure 1-1: Proposed Marine Usage Area.

1.2. Description of the Surveys

The proposed maritime usage comprises a programme of marine and intertidal site investigation surveys within the River Lee to inform the design, engineering assessment and environmental understanding of the Cork Docklands South Quays Public Realm Project and the additional Cork North Quays structural survey works. The South Quays survey scope includes structural, archaeological and ecological surveys, while the North Quays scope is limited to structural surveys at Horgan's Quay, the Turning Basin and North Deep-Water Quay. The survey methodologies described below represent the proposed survey types. Precise equipment, survey locations and sequencing may vary slightly depending on tidal conditions, access constraints, safety requirements and contractor methodologies, but will remain within the scope of the activities described and within the MUL application area.

1.2.1. South Quay Surveys

The South Quays surveys comprise structural, archaeological and ecological investigations within the River Lee and associated intertidal areas between Kennedy Quay and Blackrock Village. These investigations are intended to establish baseline information on existing quay walls, jetties, riverbed conditions, archaeology and ecology.

1.2.1.1. Visual Inspection

A visual inspection survey will be undertaken to document the condition of quay walls, jetties and associated structural elements, including construction details, dimensions, general condition, visible defects and deterioration mechanisms. Indicative inspection locations are distributed at approximately 100 m intervals along the South Jetties, South Deepwater Berth, Ford-Dunlop Jetties, ESB Jetties, Marina West and Marina East, and may be refined during the survey to ensure appropriate structural coverage. This survey is expected to require approximately 5 to 10 survey days.

1.2.1.2. Drone survey

The objective of the drone photogrammetry survey is to acquire high-resolution point cloud, 3D models and imagery data covering the Cork Docklands quay walls, jetties, and associated structures. The resulting datasets will support detailed condition assessment of structural elements (including cracks, voids, damage, and anomalies) and provide geospatially accurate information for integration into BIM models and correlation with below-water survey data. This dataset will also be used to measure verticality of the Cork Docklands quay walls. Consistent lighting conditions will be ensured to enable accurate structural inspection and heritage documentation for the shadowed areas and under-deck structures. All works will be carried out during the

day. Coverage of difficult-to-access areas will be ensured using UAV and boat-assisted operations. The Area of Interest (AoI) for the Drone photogrammetry survey can be seen below in **Figure 1-2**. This survey element is expected to require approximately 5 to 10 survey days.

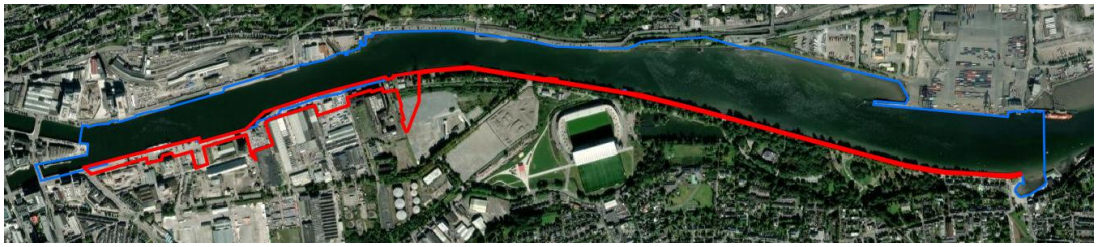

Figure 1-2: Area of interest for drone survey (red boundary).

1.2.1.3. Concrete investigations

Targeted concrete investigations will be undertaken at representative locations along quay walls, jetties and associated structures in order to assess material strength, durability and deterioration mechanisms. Investigations may include concrete core extraction, compressive strength testing, chloride testing, carbonation assessment and half-cell testing. A total of 24 indicative concrete testing locations have been identified across six structural areas, namely South Jetties, South Deepwater Berth, Ford-Dunlop Jetties, ESB Jetties, Marina West and Marina East. At the South Jetties, Ford-Dunlop Jetties and ESB Jetties, testing may include top slab, soffit and quay wall face locations. At South Deepwater Berth, Marina West and Marina East, testing will focus on top-of-structure locations along the length of the assets.

The precise locations may be adjusted slightly during the survey to account for access and safety constraints while remaining within the identified structural areas. Concrete investigations are expected to require approximately 5 to 10 survey days.

1.2.1.4. Structural steelwork investigations

Targeted investigations of structural steel elements will be undertaken where steel components are present within quay wall or jetty structures in the South Quays survey area. These investigations will focus on the South Jetties, Ford-Dunlop Jetties and ESB Jetties. Steel investigations are not required at the South Deepwater Berth, Marina West or Marina East, as steel elements relevant to the investigation scope are not present at those locations.

At each of the three applicable structures, three indicative sampling locations have been identified, resulting in a total of nine steel investigation locations across the survey area. The identified locations comprise three points at South Jetties, three points at Ford-Dunlop Jetties and three points at ESB Jetties. At each location, a dimensional survey and condition assessment will be undertaken to record member dimensions, structural configuration and evidence of corrosion, deterioration or damage, supported by photographs and location references.

Limited steel sample extraction may also be undertaken at the same nine investigation locations for laboratory tensile testing where required. Laboratory testing will be used to determine material properties including yield strength, ultimate tensile strength and elongation characteristics, with results compared against relevant structural steel standards, for example BS EN 10025, to inform the structural capacity assessment. Sample extraction locations will be repaired following sampling to maintain structural integrity. This survey element is expected to require approximately 5 to 10 survey days.

1.2.1.5. Riverbed sampling

Limited riverbed and jetty material sampling will be undertaken to characterise riverbed material and structural interface materials within the South Quays survey area and to support structural and environmental assessment of the project. The works will comprise discrete sediment or material sampling at representative locations rather than any extensive excavation or disturbance. Three sediment grab samples will be collected from the River Lee riverbed at representative locations within the central channel of the survey area using a grab sampler deployed from a survey vessel. Each sample will be collected from the upper sediment layer between 0 m and 1 m depth.

Sampling locations may be adjusted slightly during survey operations in response to site conditions and access requirements but will remain within the defined survey area. Collected samples may be analysed to determine sediment composition and physical characteristics relevant to engineering and environmental assessment. This survey element is expected to require approximately 5 to 10 survey days.

1.2.1.6. Hydraulic survey

A hydraulic survey of the River Lee will be undertaken using boat-based access to characterise baseline hydraulic conditions within the South Quays survey area and inform engineering understanding of river behaviour relevant to project design. Water samples and flow measurements will be collected at two locations within the central channel near the easternmost and westernmost boundaries of the MUL area.

The survey will include measurements of current speed, current direction, suspended solids, water temperature and related hydraulic conditions within the survey corridor. The speed and direction of water

flow will be measured to 95 percent confidence level as defined in Table 2 of the International Hydrographic Organization Standards for Hydrographic Surveys. Measurements will be collected on both spring and neap tides and will be taken through the water column at 10-minute intervals at the specified locations.

These measurements will provide baseline information on hydraulic behaviour within the survey area and assist in the interpretation of river conditions relevant to engineering design and environmental assessment. This survey element is expected to require approximately 5 to 10 survey days

1.2.1.7. ROV underwater camera survey

An underwater structural inspection survey will be undertaken using a remotely operated vehicle to capture high-resolution video and still imagery of submerged quay walls, jetties, under-jetty areas, associated structures and the adjacent riverbed within the South Quays survey area. The purpose of the survey is to document the current condition and configuration of underwater infrastructure and to provide a detailed visual record of submerged structures and riverbed features.

The Remotely Operated Vehicle (ROV) will be equipped with high-definition video cameras and still image capture systems capable of recording high-resolution imagery of underwater structures. The survey platform will also be fitted with integrated lighting systems, including diffuse LED lighting rigs, to ensure consistent illumination of structural surfaces in shaded areas, particularly beneath jetty decks and along vertical quay wall faces. When combined with the above-water inspection and drone survey datasets, this approach will provide a continuous record of structural condition from the riverbed to the quay crest.

The survey will capture imagery suitable for structural condition assessment of quay walls and jetty structures, including the identification of cracks, spalling, corrosion and marine growth. It will also support the documentation of construction details and material characteristics relevant to heritage conservation records, the identification of obstructions or anomalies associated with quay walls, jetties or the riverbed, including collapsed masonry or debris, and the identification of locations that may require further inspection by diver or additional survey methods. All survey work will be carried out during the day. This survey element is expected to require approximately 5 to 10 survey days.

1.2.1.8. ROV sonar, echo, magnetometer and LiDAR survey

A combined ROV sonar, echo sounder, magnetometer and LiDAR survey will be undertaken to collect geospatial and geophysical data on submerged structures, riverbed morphology and potential obstructions or buried features within the South Quays survey area. This survey is intended to complement the visual inspection and ROV camera survey by providing high-resolution below-water spatial information and geophysical data. The survey will support the mapping of submerged quay walls, jetties and adjacent riverbed

conditions and may assist in the identification of structural anomalies, buried objects, areas of morphological change and other features relevant to engineering and heritage assessment. The outputs will contribute to a more complete understanding of the geometry and condition of underwater infrastructure and the surrounding riverbed environment.

This survey element is expected to require approximately 5 to 10 survey days, although the precise duration may depend on the final survey methodology, tidal conditions and vessel logistics at the time of implementation

1.2.1.9. Bathymetric survey

A bathymetric survey will be undertaken within the South Quays survey area to map riverbed levels and morphology adjacent to quay walls, jetties and associated structures. The purpose of the survey is to provide information on underwater topography and to support understanding of bed levels and morphological conditions along the waterfront corridor. The resulting bathymetric data will inform engineering interpretation of riverbed configuration and support correlation with other structural and geophysical datasets, including the ROV survey outputs and any riverbed material sampling results. The bathymetric survey will therefore contribute to a coherent baseline dataset describing both the submerged structures and the adjacent riverbed environment. This survey element is expected to require approximately 5 to 10 survey days.

Figure 1-3: Bathymetry survey coverage within the MUL area.

1.2.2. North Quay Surveys

The North Quays structural surveys relate to existing quay wall structures at Horgan's Quay, the Turning Basin and North Deep-Water Quay. These investigations are intended to assess quay wall faces, suspended slabs, wall toe conditions and any evidence of scour, undermining, cracking, displacement or other structural deterioration affecting the existing waterfront structures.

The North Quays programme comprises four principal survey elements, namely above-water visual and physical inspection, underwater structural survey, material testing and investigation, and sonar or echo sounding survey where required. Each North Quays structural survey element is expected to require approximately 1.5 to 2 weeks of active fieldwork, giving a collective North Quays programme duration of approximately 6 to 8 weeks. The survey programme will be delivered separately from the South Quays ecological and archaeological surveys and may proceed sequentially or with limited overlap depending on access, tidal conditions, weather, safety requirements, contractor availability and other operational constraints.

Survey works are expected to take place during daytime hours, although temporary lighting may be required in specific circumstances. Above-water structural inspections and concrete coring at quay walls and suspended slabs must be coordinated with access arrangements along the N8 corridor and the Kent Station compound, including any traffic management, rail safety restrictions and working-hour limitations. Underwater structural surveys and any associated sonar profiling will require suitable tidal states, safe diving conditions and adequate underwater visibility, and will only be undertaken where vessel positioning or temporary mooring can be used safely in order to minimise seabed interaction.

1.2.2.1. Above water visual survey

An above-water visual and physical inspection will be undertaken to document the condition of the existing quay walls and suspended slabs at Horgan's Quay, the Turning Basin and North Deep-Water Quay. The inspection will record visible defects, deterioration, cracking, deformation, surface condition and other indicators of structural distress in the accessible above-water fabric. The survey will provide baseline information on the current condition of the structures and will assist in identifying locations requiring more focused underwater inspection or targeted material testing. The expected duration of this survey element is approximately 1.5 to 2 weeks.

1.2.2.2. Underwater structural survey

An underwater structural survey will be undertaken to inspect the submerged quay wall faces, wall toe and scour conditions adjacent to the North Quays structures. The survey is expected to comprise diver-led, vessel-supported inspection of the underwater structural fabric and immediately adjacent riverbed conditions, subject to suitable tidal state, safe diving conditions and adequate underwater visibility. The purpose of the survey is to identify submerged defects, deterioration, scour, undermining or other structural issues that may not be visible from above-water inspection alone. The findings will be used to supplement the above-water inspection and to inform the scope and targeting of any further material testing where required. The expected duration of this survey element is approximately 1.5 to 2 weeks.

1.2.2.3. Material testing and Investigation

Material testing and investigation will be undertaken to characterise the condition and material properties of existing structural elements at Horgan's Quay, the Turning Basin and North Deep-Water Quay. The scope includes a minimum of two above-water concrete core locations per structure together with conditional underwater sampling where required, giving a minimum of six above-water core locations across the three North Quays structures. Intrusive underwater concrete sampling by coring or chipping will be limited to locations where the findings of the above-water and underwater structural inspections indicate a specific need for additional investigation. The number and timing of such samples will be confirmed in the appointed structural survey contractor's programme, having regard to access, safety and the emerging inspection findings. This approach ensures that intrusive investigation remains targeted and proportionate to the structural assessment requirements. The expected duration of this survey element is approximately 1.5 to 2 weeks.

1.2.2.4. Sonar / echo sounding survey

A vessel-based sonar or echo sounding survey may be undertaken where required to characterise riverbed conditions adjacent to the wall toe and to support assessment of local morphology, scour and underwater geometry at the North Quays structures. This element may comprise multibeam or single beam sonar profiling of the riverbed, depending on the appointed contractor's methodology and the site conditions encountered.

The purpose of this survey would be to identify riverbed levels, scour, loss of seabed material, obstructions or other features relevant to the structural condition of the quay wall toe and founding conditions. Where required, the sonar / echo sounding survey will be undertaken from a survey vessel using a multibeam echo sounder or single-beam sonar system. The expected duration of this survey element is approximately 1.5 to 2 weeks.

1.2.3. Archaeological surveys

A programme of archaeological surveys will be undertaken within the scheme boundary shown in **Figure 1-4** and **Figure 1-5**, and will apply to the South Quays only. No archaeological surveys are proposed as part of the North Quays structural survey programme. The archaeological survey programme will be undertaken within the River Lee and associated intertidal zone in order to establish the baseline archaeological and cultural heritage conditions within the South Quays survey area prior to the commencement of structural investigations.

The archaeological survey programme comprises an intertidal archaeology survey, archaeological metal detecting survey, archaeological wade survey, archaeological dive survey and archaeological geophysical survey. These survey elements will be programmed having regard to tidal access, weather conditions, water clarity, health and safety requirements and the availability of suitably qualified and licensed archaeological personnel and specialist survey equipment. Each archaeological survey element is expected to require approximately 5 to 10 survey days of active fieldwork, although the precise sequencing and overlap of individual survey components will depend on operational conditions at the time of survey.

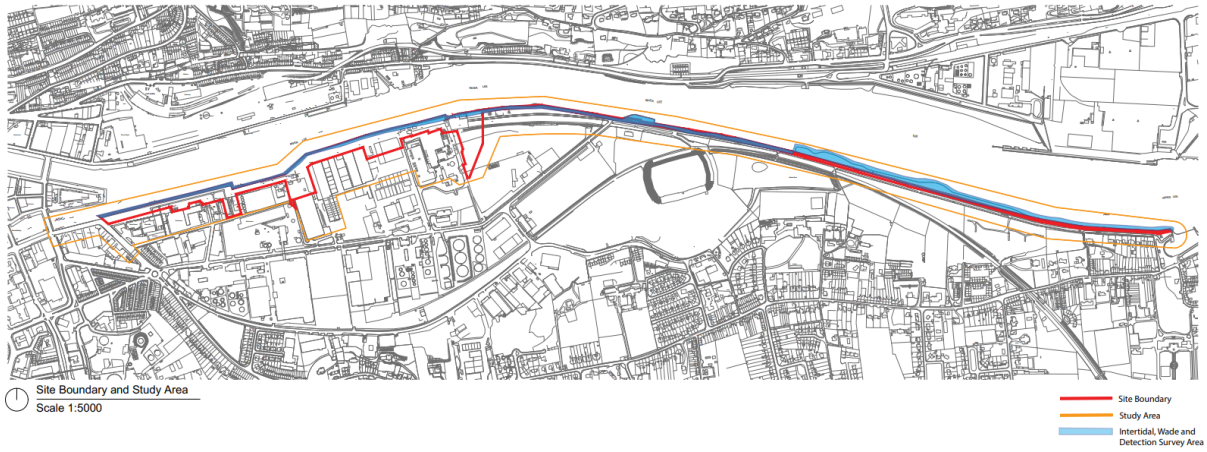

Figure 1-4: Archaeological intertidal, wade, and metal detection survey area.

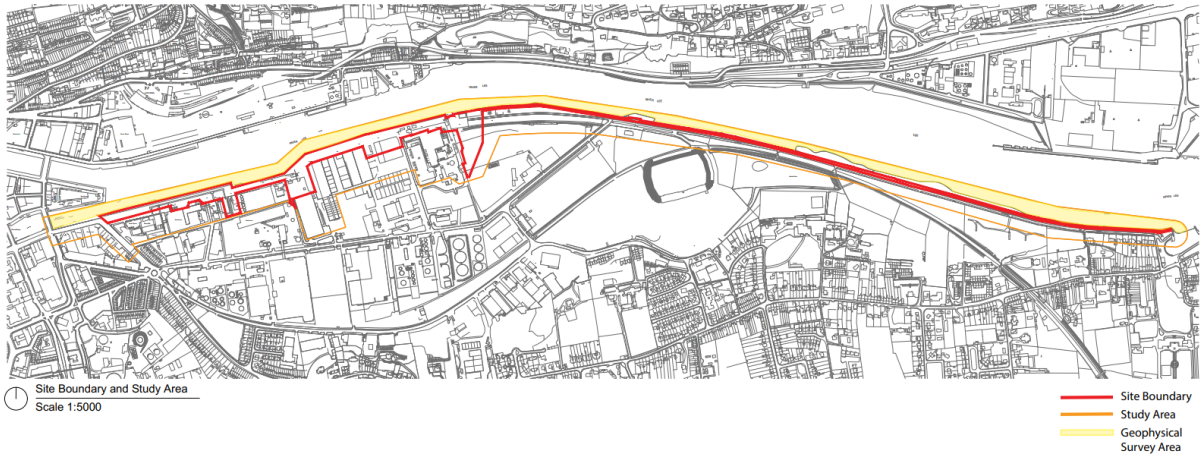

Figure 1-5: Archaeological geophysical survey area.

1.2.3.1. Intertidal Archaeology survey

An intertidal archaeology survey will be undertaken along the South Quays foreshore and associated intertidal margins to identify, inspect, record and assess any archaeological features, deposits or structures present within the exposed intertidal zone. The survey will be undertaken during suitable tidal windows to allow safe access to exposed foreshore areas and will contribute to the archaeological baseline for the South Quays survey corridor.

The survey will include a systematic walkover inspection of the intertidal area and visual examination of exposed sediments, foreshore surfaces, structural remnants and waterfront features. The purpose of the survey is to identify archaeological material or features of potential cultural heritage interest that may be present within the exposed intertidal zone and to establish the need for any further focused recording or investigation. This survey element is expected to require approximately 5 to 10 survey days.

1.2.3.2. Quay wall survey

As part of the intertidal archaeology survey, a quay wall survey will be undertaken in order to inspect, record and assess those elements of the quay walls and associated structures that may have archaeological or heritage significance. This will include visual examination of wall fabric, construction form, visible repairs, historic detailing and any exposed features of potential archaeological interest within the intertidal and waterfront environment. The quay wall survey will assist in documenting the historic character and structural form of the existing waterfront and will provide supporting baseline information for archaeological assessment of the South Quays project area. Recording will be undertaken at a level appropriate to the visible heritage resource and the conditions encountered during the survey.

1.2.3.3. Archaeological metal detecting survey

An archaeological metal detecting survey will be undertaken within the South Quays survey area as part of the archaeological investigation of the intertidal zone. The purpose of this survey is to identify metallic archaeological material that may be present within exposed sediments, foreshore deposits or other accessible intertidal areas and that may not be readily visible during the intertidal walkover survey alone. The survey will be undertaken by suitably qualified archaeological personnel using appropriate detection equipment and will be carried out in accordance with the relevant archaeological methodology and licensing requirements. Any metallic finds or anomalies identified during the survey will be inspected, recorded and assessed as part of the archaeological baseline for the South Quays survey area. The archaeological metal detecting survey will be undertaken during suitable tidal windows and weather conditions to allow safe access to the foreshore and

intertidal margins. This survey element is expected to require approximately 5 to 10 survey days of active fieldwork.

1.2.3.4. Archaeological wade survey

An archaeological wade survey will be undertaken within shallow intertidal and nearshore areas of the South Quays survey corridor where access by wading is feasible and safe. The purpose of the wade survey is to allow closer visual inspection and recording of archaeological features, structures or anomalies present within shallow-water areas that may not be fully accessible during the intertidal archaeology survey. The survey will be undertaken by suitably qualified archaeological personnel during appropriate tidal and weather conditions and will focus on the shallow-water margin of the survey corridor where submerged or partially submerged archaeological material may be present. The survey results will contribute to the archaeological baseline for the South Quays area and may assist in refining the scope of any subsequent dive inspection or geophysical interpretation where required. This survey element is expected to require approximately 5 to 10 survey days of active fieldwork.

1.2.3.5. Archaeological dive survey

An archaeological dive survey will be undertaken where required within submerged areas of the South Quays survey corridor in order to inspect and record underwater archaeological features, structures or anomalies. The purpose of the dive survey is to provide direct underwater inspection of locations where archaeological material may be present below the waterline and cannot be adequately assessed through intertidal inspection, wading survey or remote sensing methods alone. The dive survey will be undertaken by suitably qualified and appropriately licensed archaeological divers and will be dependent on suitable tidal conditions, safe diving conditions and adequate underwater visibility. The survey will allow the presence, nature and condition of underwater archaeological receptors to be visually confirmed and recorded within the survey area. This survey element is expected to require approximately 5 to 10 survey days of active fieldwork, although actual progress will be dependent on safe diving conditions, water clarity and operational constraints at the time of survey.

1.2.3.6. Archaeological geophysical survey

An archaeological geophysical survey will be undertaken within the South Quays survey area in order to identify potential buried or submerged archaeological features using appropriate geophysical methods. The purpose of this survey is to support the wider archaeological baseline by detecting anomalies or features of potential heritage interest that may not be visible at the sediment surface or within the water column. The survey may include the use of detection devices and other geophysical survey techniques appropriate to the riverine and intertidal environment. Prior to undertaking the geophysical survey works, an application for

a Detection Device Licence will be submitted to the Licensing Section of the National Monuments Service. A survey Method Statement will accompany this application and will also be provided to the Underwater Archaeology Unit of the National Monuments Service to ensure that the proposed survey methodologies are consistent with archaeological guidance and licensing requirements. Processing of the Detection Device Licence by the National Monuments Service typically requires approximately 10 to 15 working days. The archaeological geophysical survey will be programmed having regard to the licensing process, tidal conditions, access and weather. This survey element is expected to require approximately 5 to 10 survey days of active fieldwork.

1.2.4. Ecological surveys

Marine ecological surveys will be undertaken to support the MUL application for the Cork Docklands North and South Quays Project on the South Quays only. The proposed project includes public realm improvements, flood defence works, quay wall repair and waterfront enhancement along the southern bank of the River Lee.

Elements of the project and associated site investigation surveys are proposed to take place below the High Water Mark (HWM) along the southern bank of the River Lee. Intertidal and subtidal ecological surveys will therefore be undertaken to characterise the existing benthic environment within the survey area and to identify any ecological sensitivities relevant to the proposed in-river investigations.

The ecological survey programme will include intertidal habitat survey and targeted ecological observations within the intertidal and nearshore areas of the River Lee. These surveys will provide baseline information on intertidal habitats and associated biological communities present within the study area. The information gathered will support the identification of ecological sensitivities and inform appropriate mitigation measures associated with the proposed survey works and any future project activities.

Given that some survey activities may require boat-based access to quay walls and structures at river level, targeted checks for signs of otter will also be undertaken in areas that may be inaccessible from land. These observations will focus on identifying any evidence of otter activity along quay structures, river margins and other suitable resting or access locations within the survey area.

The ecological surveys will focus on the intertidal and nearshore areas of the River Lee along the southern bank of the project corridor. The survey area lies within the wider Cork Harbour estuarine system and partially overlaps with the Cork Harbour Special Protection Area (SPA 004030). This SPA is designated for a range of wintering waterbird species that rely on intertidal mudflat and sandflat habitats for foraging.

The ecological survey programme has therefore been designed to provide sufficient baseline information on habitats and ecological receptors within the survey area to support consideration of potential interactions

with the conservation objectives of Cork Harbour SPA and the Lower Lee Estuary. A map of the ecological survey area is shown in **Figure 1-6**. The intertidal and subtidal survey elements are expected to require approximately 5 to 10 survey days of active fieldwork, while the otter survey is expected to require approximately 2 to 3 survey days.

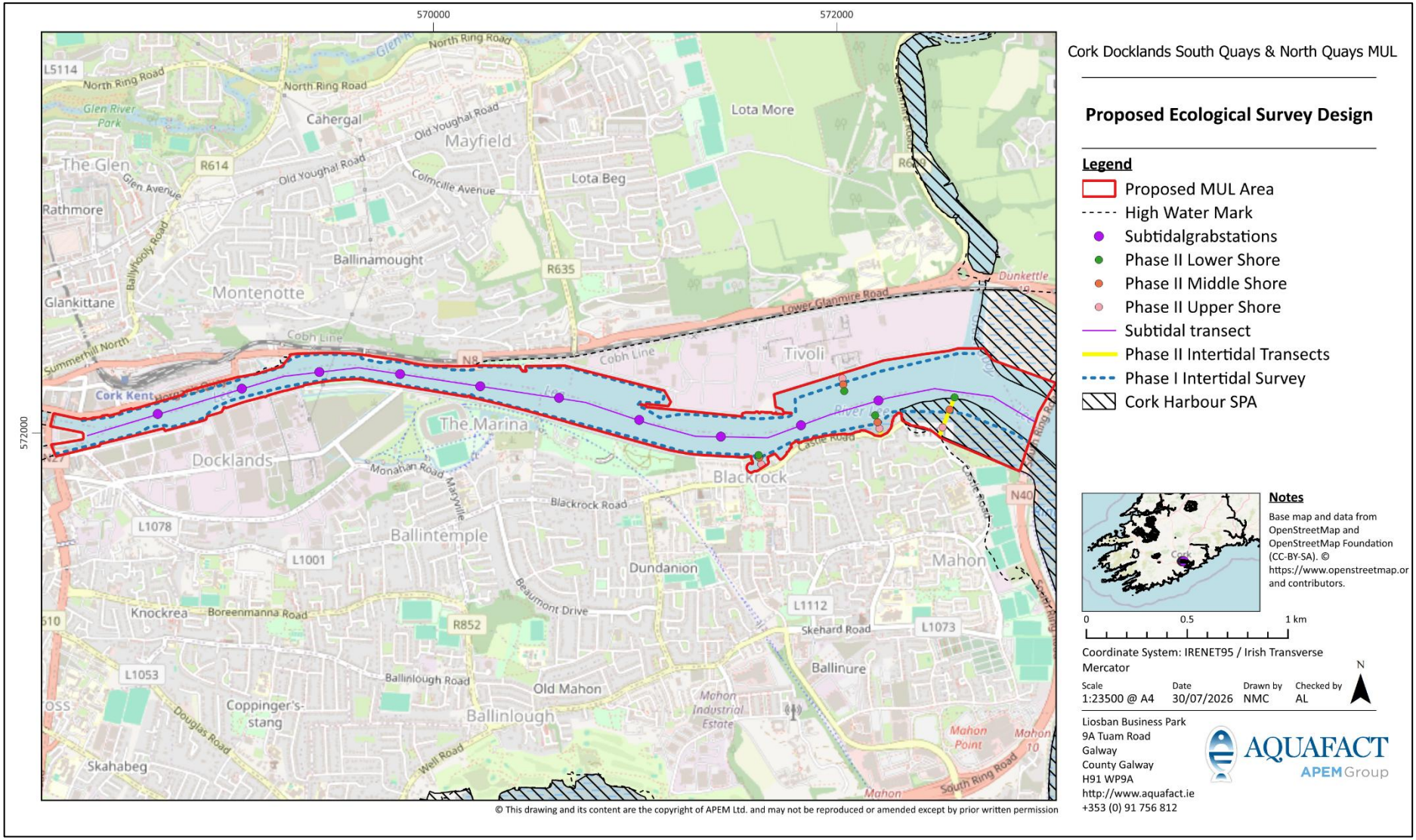

Figure 1-6: Proposed Ecological survey design.

1.2.4.1. Intertidal survey

A Phase I intertidal survey will be undertaken along both the north and south banks of the River Lee within the South Quays study area, covering an approximate total length of 10 km from Lapp's Island to the west to the east of Blackrock Castle along the southern bank and to the eastern shoreline of Tivoli Industrial Estate on the northern bank, comprising a northern transect of 4.98 km and a southern transect of 5.03 km. The survey will be undertaken where practicable, during mean low water spring conditions to maximise exposure of the intertidal zone and facilitate habitat characterisation.

Where the intertidal zone is safely accessible on foot, the Phase I survey will be undertaken as a walkover survey. Where the riverside comprises vertical or near-vertical quay walls and the intertidal zone is not safely accessible, predominantly along the southern bank, intertidal habitats will be characterised using high-quality oblique photography and visual assessment from a survey vessel. This approach will allow the extent and nature of intertidal habitats to be recorded safely while maintaining consistency across the study area.

Intertidal biotopes will be identified and classified in accordance with the EUNIS and JNCC marine habitat classification systems. Key attributes, including dominant species, substrate type, sediment characteristics, exposure and evidence of anthropogenic influence, will be recorded. Observations will be georeferenced using handheld GPS and supported by high-resolution photographs and detailed field notes, with habitat extents and biotope boundaries mapped in the field and subsequently digitised using GIS to produce intertidal habitat maps. Attention will be given to intertidal habitats of relevance to SPA qualifying interests, particularly those supporting benthic prey resources for wintering waterbirds.

A Phase II quantitative intertidal transect survey will be undertaken to characterise middle and lower shore intertidal habitats within the study area. A total of four Phase II intertidal transects will be surveyed towards the eastern end of the study area, where soft intertidal ground is present, and each transect will extend across the upper, middle and lower shore where feasible. Due to the presence of fine, soft mudflat sediments and limited safe access in parts of the intertidal zone, Phase II sampling will be undertaken from a vessel at high water using a 0.025 m^2 Van Veen grab deployed from the appointed contractor's rigid inflatable boat. The vessel will be operated by suitably qualified personnel in accordance with relevant marine safety regulations.

At each transect, sampling will be undertaken at three shore levels, upper, middle and lower shore. Triplicate grab samples will be collected at each shore level for benthic macrofaunal analysis, together with one additional grab sample per station for sediment Particle Size Analysis and organic carbon analysis, and the depth of any anoxic layer will be recorded for each sample. During the Phase II survey, a Fifish V6 Expert ROV will be deployed along each transect to document middle and lower shore intertidal habitats, covering

approximately 50 m per transect depending on the length of the intertidal zone at each transect location. A total of 48 samples will be collected with 36 samples will be collected for benthic invertebrate faunal analysis for the Phase II intertidal survey, and 12 samples will be collected for Particle Size Analysis (PSA).

Video footage will be reviewed at the appointed contractor's offices to support intertidal biotope classification, with salient features recorded and supplemented by still imagery where appropriate. All faunal samples will be preserved in 4 percent buffered formalin in clearly labelled containers, and sediment samples for Particle Size Analysis and organic carbon analysis will be retained in separate labelled containers. Where features of conservation interest are identified, their extent will be mapped using GPS to inform the assessment of ecological sensitivity.

PSA will be undertaken on 12 sediment samples using standard granulometric methods to determine sediment grain size distribution and support habitat classification and interpretation of the benthic data. Samples will be dried, sieved and measured to generate particle size fractions for reporting in accordance with the Folk sediment classification scheme. Following drying, organic carbon analysis will be completed on the same 12 samples by a certified laboratory using the Loss on Ignition technique.

1.2.4.2. Subtidal survey

A subtidal benthic survey will be undertaken within the main River Lee channel in the South Quays study area, extending for approximately 4 km, in order to characterise subtidal sediments and benthic macrofaunal communities and to establish baseline ecological conditions for the MUL application and any subsequent environmental assessment. Subtidal sampling will be undertaken at approximately 10 pre-defined stations spaced at about 400 m intervals, subject to final station positioning, substrate suitability, water depth and site access constraints. At each station, duplicate benthic faunal samples will be collected using an appropriate grab sampler, such as a duplicate 0.025 m^2 Van Veen grab, where conditions permit. Each faunal sample will be sieved within 24 hours of retrieval through a 1.0 mm mesh, with retained material preserved in buffered formalin and subsequently transferred to industrial methylated spirits for laboratory analysis. A total of 30 samples will be collected, with 20 samples for faunal analysis, and 10 samples for Particle Size Analysis (PSA).

Macrofaunal samples will be identified to species level where practicable, and the resulting abundance data will be used to describe community composition and diversity. In addition, one sediment sample per station will be collected for Particle Size Analysis to determine sediment grain size distribution and support habitat classification and interpretation of the benthic community data. Where feasible, sediment sub-samples may also be retained for additional sediment parameters, including organic content, subject to laboratory requirements and regulatory consultation. All sampling locations will be recorded using differential GPS, and

the survey results will be used to classify subtidal habitats in accordance with relevant guidance and to identify any ecological sensitivities within the study area.

1.2.4.3. Otter Survey

Otter (*Lutra lutra*) is a European Protected Species listed under Annex IV of the Habitats Directive and is known to utilise riverine and estuarine environments, including heavily modified urban waterways.

Given the requirement for boat-based access to undertake intertidal and subtidal surveys along the South Quays, a targeted otter survey is proposed to assess the potential presence of otter in areas of the quay that are inaccessible by foot, particularly at river level below the High-Water Mark.

The otter survey will comprise a boat-based visual inspection of quay walls, river margins and associated structures within the entirety of the MUL area, undertaken at suitable tidal states to allow effective inspection of potential otter habitat features. The survey will focus on the identification and recording of evidence of otter presence, including holts, couches, spraints and feeding remains. In addition, the suitability of quay structures, river margins and associated features for use by otters for resting, sheltering and commuting will be assessed.

Survey effort will be targeted primarily at areas that cannot be safely accessed from the shoreline**,** ensuring that otherwise inaccessible habitat features are adequately assessed. All observations will be recorded and used to inform an evaluation of otter activity and habitat use within the study area. The otter survey area will comprise the entirety of the MUL area as outlined in Attachment 3.4 which accompanies this application

1.3. Purpose of this Report

This report has been prepared to assess the impacts of the Project on relevant Annex IV species identified as having potential to be present in the proposed project, under Article 12 of the European Community (EC) Directive (92/43/EEC) on the conservation of natural habitats and of wild flora and fauna (commonly known as the Habitats Directive).

2. Legislation

2.1. Legislative Background

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (commonly known as the Habitats Directive) is European Community legislation regarding nature conservation established to ensure biodiversity is conserved through the conservation of natural habitats and wild fauna and flora in Europe.

The Habitats Directive was originally transposed into Irish law by the *European Communities (Natural Habitats) Regulations, 1997* (S.I. No. 94 of 1997). The 1997 Regulations were subsequently revoked and replaced by the *European Communities (Birds and Natural Habitats) Regulations 2011*, as amended (herein referred to as the 2011 Birds and Natural Habitats Regulations).

A network of sites of conservation importance hosting habitats and species as needing to be either maintained at or restored to favourable conservation status have been identified by each Member State. These sites are known as European sites within the Natura 2000 network.

European sites in Ireland that form part of the Natura 2000 network of protected sites comprise Special Area of Conservation (SAC) sites designated due to their significant ecological importance for habitats and species protected under Annex I and Annex II respectively of the Habitats Directive, and Special Protection Areas (SPA) sites designated for the protection of populations and habitats of bird species protected under the European Union (EU) Birds Directive (Council Directive 2009/409/EEC). The sites are formally designated by the relevant minister under a statutory instrument. Candidate SAC and candidate SPA sites (*i.e.,* cSAC or cSPA) have the same level of protection as fully designated sites under Irish Law. The specific named habitats and/or (non-bird) species for which an SAC are selected are called the 'Qualifying Interests' (QIs), of the site. The specific named bird species for which a SPA is selected is called the 'Special Conservation Interests' (SCIs). QIs and SCIs are collectively referred to as conservation features (OPR, 2021).

The Habitats Directive requirements are divided in two group chapters. The first includes the Articles 3 to 11, designated as ‘Conservation of natural habitats and habitats of species’. The second group includes the Articles 12 to 16, designated as ‘Protection of Species’, which focus on establishing a system of strict protection for the animal species listed under Annex IV(a) of the Habitats Directive.

Article 12 of the Habitats Directive, under Regulation 51 of the 2011 Birds and Natural Habitats Regulations states:

1. *Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV(a) in their natural range, prohibiting:*

   (a) all forms of deliberate capture or killing of specimens of these species in the wild;

   (b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;

   (c) deliberate destruction or taking of eggs from the wild;

   (d) deterioration or destruction of breeding sites or resting places.

2. *For these species, Member States shall prohibit the keeping transport and sale or exchange, and offering for sale or exchange, of specimens taken from the wild, except for those taken legally before this Directive is implemented.*

3. *The prohibition referred to in paragraph 1(a) and (b) and paragraph 2 shall apply to all stages of life of the animals to which this Article applies.*

4. *Member States shall establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV(a). In the light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.*

Additionally, protection measures implemented under Article 12 of the Habitats Directive should ensure or contribute to the maintenance or restoration, at favourable conservation status, of Annex IV species of Community Interest. In the marine environment, Annex IV animal species of the Habitats Directive include all cetaceans (whales and dolphins), the otter and some marine turtles.

2.2. Guidance

This report has been prepared in accordance with the following guidance:

- Department of Art, Heritage and the Gaeltacht (DAHG) (2014) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters
- Maritime Area Regulatory Authority (MARA) (2024) Applicant Technical Guidance (V7) for Maritime Area Consents and Licensing.

- EC (2021) Guidance document on the strict protection of animal species of Community interest under the Habitats Directive. Commission Notice (2021) and

- The Joint Nature Conservation Committee (JNCC) *et al.* (2010) The protection of marine European Protected Species from injury and disturbance: Guidance for the marine area in England and Wales and the United Kingdom (UK) offshore marine area' published by the Joint Nature Conservation Committee (JNCC), Natural England and Countryside Council for Wales (now Natural Resources Wales).

An overview of the previous literature regarding the Annex IV species baseline in Irish waters, included the following sources:

- Baseline desk studies and field surveys carried out for the proposed project area, including National Biodiversity Data Centre (NBDC) records for otter presence and cetacean sightings within the River Lee and Lough Mahon. These are supported by national surveys such as Reid *et al*. (2013a) National Otter Survey of Ireland 2010/12, Berrow *et al*. (2010) Irish Cetacean Review, and Small Cetaceans in the European Atlantic and North Sea (SCANS) project abundance estimates (Hammond *et al.*, 2013; Gilles *et al.,* 2023), species-specific reviews such as Rogan *et al*., (2018) along with seal distribution data from Cronin *et al*. (2007) and Morris & Duck (2019).

- Site Synopsis, Conservation Objective Reports and Natura 2000 Forms available from NPWS,

- Published and unpublished NPWS reports on protected habitats and species including Irish Wildlife Manual reports such as Bailey & Rochford (2006) *Otter Survey of Ireland 2004/2005*, Reid *et al*. (2013) *National Otter Survey of Ireland 2010/12*, Reid *et al*., (2025) *Otter Survey of Ireland 2023-24*, and Morris & Duck (2019) *Aerial thermal-imaging survey of seals in Ireland*, Species Action Plans, and Conservation Management Plans and the NPWS Conservation Status Assessment Report for otter (*Lutra lutra*) [NPWS, 1355].

Existing relevant mapping and databases *e.g.* waterbody status, species and habitat distribution *etc*. (sourced from the Environmental Protection Agency - http://gis.epa.ie/, the National Biodiversity Data Centre - http://maps.biodiversityireland.ie and the NPWS - http://www.npws.ie/mapsanddata/.

3. Annex IV Species in the Project Area

All cetacean species are listed under Annex IV of the Habitats Directive, which affords them strict protection within Irish waters. To date, 27 species of cetaceans have been recorded in Ireland (NBDC, 2024), ranging from resident populations to wide-ranging migratory species, including the recently confirmed whale species (narwhal) recorded in Ireland for the first time in November 2025.

The NBDC have a tool for generating a species list over 1 km grid squares based on NBDC records, which was used in assessing the marine mammal species likely to be found in the Cork Harbour area. This includes the following list of grid squares: W6871, W6872, W6972, W7072, W7171, W7172, W7272; however, W7171, W7172, and W7272 grid squares did not include records of marine mammals. Data was filtered to contain sightings and strandings within the past 10 years and the area upriver was also investigated. The grid squares included in the assessment cover the entirety of the proposed Maritime Usage Licence area.

Table 3-1: Annex IV species observed in the grid squares found on the National Biodiversity Data Centre (NBDC). Species with an asterisk(*) are found on Annex II (*i.e.,* not Annex IV) of the Habitats Directive. Accessed February 2026.

Pinnipeds
Grey Seal (*Halichoerus grypus*)*
Harbour Seal (*Phoca vitulina*)*
Odontocetes (toothed whales and dolphins)
Bottle-nosed Dolphin (*Tursiops truncatus*)
Common Dolphin (*Delphinus delphis*)
Common Porpoise (*Phocoena phocoena*)
Killer Whale (*Orcinus orca*)
Mustelidae
Otter (*Lutra lutra*)
Chiroptera
Common pipistrelle (*Pipistrellus pipistrellus*)
Soprano pipistrelle (*Pipistrellus pygmaeus*)
Leisler's bat (*Nyctalus leisleri*)
Daubenton's Bat (*Myotis daubentonii*)
brown long-eared bat (*Plecotus auritus*)

The proposed surveys are located within the River Lee lower estuary and Lough Mahon, an area that supports a range of marine and estuarine habitats and which may be used by Annex IV species on a resident, transient or occasional basis. The additional Cork North Docks / North Quays structural survey works are located within the same River Lee urban estuarine environment and do not introduce any new habitat types or species receptors beyond those already considered in this assessment. The assessment of Annex IV species presented

in this section has been informed by a review of available baseline information, including National Biodiversity Data Centre (NBDC) records, National Parks and Wildlife Service (NPWS) datasets, relevant site synopses and conservation objectives for European sites, and published literature relating to the distribution and ecology of Annex IV species in Irish coastal waters.

Given the temporary, small-scale and localised nature of the proposed site investigation surveys, the zone of influence for potential effects on Annex IV species is expected to be limited to the immediate vicinity of survey vessels, survey locations and sampling locations within the River Lee lower estuary and Lough Mahon. Mobile marine species such as cetaceans are capable of avoiding areas of activity, and any potential interactions would be short-lived and reversible. Furthermore, cetacean presence within the area is generally infrequent and appears to relate to transient individuals, with the exception of common dolphin (*Delphinus delphis*), which is recorded more regularly. While not listed under Annex IV of the Habitats Directive, harbour and grey seals are also known to be present along the lower River Lee estuary on a transient basis (likely for foraging). For more site-associated species such as otter, the assessment considers the availability of suitable habitats within and adjacent to the survey footprint, including the presence or absence of breeding or resting sites.

This section provides an overview of the Annex IV species that are known or considered likely to occur within or in proximity to the proposed project and that could, in principle, interact with the proposed site investigation surveys. The assessment focuses on those species for which a plausible pathway exists for interaction with the site investigation surveys, taking account of species ecology, habitat use and the characteristics of the proposed surveys. Species with no credible risk pathway are screened out at an early stage or addressed briefly to ensure a proportionate and focused assessment. An overview of the Annex IV species distribution and abundance estimations are summarised in **Section 3.1** to **Section 3.7**, while **Section 3.8** provides a brief summary of other (non-Annex IV) species.

3.1. Otter (*Lutra lutra*)

The Eurasian otter is a top predator in freshwater systems; thus, its presence has a significant role in the well-being of these ecosystems (Reid *et al*., 2013a). Aquatic prey and shelter availability are two basic requirements in the growth of otter populations. This species is strictly protected under Annex II and IV of the Habitats Directive; thus, its listing under Annex II requires Member States to designate Special Areas of Conservation (SACs) for its protection. Otters are designated as a species of conservation concern and high priority in Europe, due to historical and ongoing population declines associated with deterioration in water quality (including eutrophication), habitat loss and fragmentation, and the introduction of invasive alien species (Reid *et al.,* 2013; Gutleb & Kranz 1998; Leppakoski *et al*., 2002). Consequently, otters have been identified as 'sentinel species' for the dynamics and diversity of pesticides in certain aquatic food webs (Lemarchand *et al*.,

2011; Reid *et al*., 2013). The Eurasian otter is currently listed as Near Threatened on the International Union for Conservation of Nature (IUCN) Red List global assessment of the species (Loy *et al.*, 2022). However, in Ireland, otter are currently listed as Least Concern under Ireland's Red List (No. 12) indicating otter are under less negative pressure in Ireland compared to mainland Europe.

In Ireland, the species is widespread throughout the country and there are 44 SACs (NPWS, 2009) with otter as a QI, with associated habitats ranging from estuaries, lakes, coastal lagoons, dunes and alluvial forests (Bailey and Rochford, 2006). In the context of the proposed site investigation surveys in the River Lee, the nearest SAC for which otter is a Qualifying Interest is the Blackwater River (Cork/Waterford) SAC [002170], with potential hydrological connectivity located approximately 16.7 km north of the Project area. This SAC comprises an extensive river system entering the sea at Youghal, draining multiple mountain ranges and counties including Kerry, Cork, Limerick, Tipperary and Waterford. The freshwater river habitat available to otter within this SAC has been calculated at approximately 599.54 km (NPWS, 2012), underlining its importance at a national scale. In addition, the Gearagh SAC [000108], located approximately 36.6 km west of the proposed Project area adjacent to Macroom, is also designated for otter and a potential hydrological connection can be identified. The freshwater river habitat available to Otter within Gearagh SAC is calculated as 10.6 km.

While Cork City and the Docklands area are not designated as an SAC for otter, the species is well documented within the urban environment. In 2016, Nature Network initiated an otter project in Cork City in response to concerns regarding habitat loss and fragmentation associated with urban expansion. This initiative included structured field surveys and citizen science programmes to document otter distribution and promote awareness of the species within the city. The presence of an established 'Cork City Otter Trail' further reflects the recognised and visible status of otters along the River Lee corridor.

Targeted survey work undertaken between May and December 2021 (Dalton *et al.*, 2022) examined the status and distribution of otter within Cork City and Cork Harbour. The study confirmed otter presence across urban, freshwater and estuarine environments, demonstrating that the species utilises the River Lee, associated tributaries, docklands, and coastal transitional habitats (Dalton *et al*., 2022). Cork City's position at the interface of freshwater and marine systems provides a mosaic of foraging and commuting opportunities, and the findings indicate that this complex urban landscape continues to support the otter population. Notably, the mouth of the Glashaboy Estuary, which enters the Lough Mahon transitional waterbody to the east of the proposed Project area, recorded high levels of sprainting activity during the survey and was identified as an area of importance for otter (Dalton *et al*., 2022).

Overall, the 2021 survey findings confirm that otters are widespread within Cork City, the River Lee corridor and Cork Harbour, occupying freshwater, estuarine and coastal habitats. This is directly relevant to the

proposed Docklands and River Lee site investigation surveys, as otter is a strictly protected Annex IV species. Although the Project area is not located within an SAC designated for otter, the documented presence of the species locally necessitates appropriate consideration under Article 12 of the Habitats Directive. An up-to-date otter survey will therefore be undertaken as part of the site investigation surveys to confirm current usage of the Project area, identify any holts, couches or significant resting places, and inform the development of proportionate mitigation measures where required. The additional North Quays structural survey works will also be located within the urban River Lee corridor and will be temporary and localised in nature. Potential interactions with otter are therefore considered to be consistent with those already assessed for the wider Docklands site investigation survey programme. Records from the National Biodiversity Data Centre (NBDC) confirm the presence of otter in the Cork Docklands and the wider Cork City Centre area, reflecting the species' widespread distribution along the south coast of Ireland and within Cork City itself.

3.2. Short-beaked common dolphin (*Delphinus delphis*)

Short-beaked common dolphin (*Delphinus delphis*) (referred to as common dolphin) is one of the most abundant cetacean species in Irish waters, inhabiting both continental shelf and offshore environments (Murphy *et al.,* 2013). Records from the National Biodiversity Data Centre (NBDC, 2026) indicate that within Lough Mahon, the River Lee and the proposed Project area, short-beaked common dolphin is the most frequently recorded cetacean species. Records include strandings as well as sightings of individuals and small groups (up to six animals).

Lough Mahon and the River Lee comprise shallow, strongly tidal, semi-enclosed transitional waters with predominantly muddy substrates. Such habitats are not considered optimal for common dolphin, which is typically a wide-ranging, pelagic species associated with offshore waters and aggregations of shoaling fish. Occurrence within the Project area is therefore likely to be occasional and transient, likely associated with prey movements or tidal foraging excursions rather than regular residency.

This species is listed on Annex II and Annex IV of the Habitats Directive. Annex II requires Member States to designate Special Areas of Conservation (SACs) for the species where appropriate, while Annex IV affords strict protection to individuals throughout their natural range. To date, no SACs have been designated for common dolphin in Ireland, however previous literature has assessed that they are mostly sighted in water temperatures above 15°C at depths of 400-1000 meters (Cañadas *et al.,* 2009). Cañadas *et al.,* (2009) also calculated an average group size of 15 ± 2.2 individuals (± standard error; range 1-239), which showed an increasing trend with depth from 8.0 ± 1.44 individuals in waters under 400 m of depth to 18.6 ± 2.76 individuals for water depths more than 2000 m. In western European waters, Reid *et al.* (2003) reported high

numbers of common dolphins in the Celtic Sea, St. George's Channel, west of the English Channel and off southern and western Ireland during the summer months between 1978 and 1998.

During the ObSERVE programme Phase II (2021-2022) (Giralt Paradell *et al*., 2024), common dolphins were the most sighted cetacean species across all survey seasons (summer and winter) and was observed in all Stratum, however sighting and increased group sizes were larger in summer. Design-based estimates from Stratum 6C (Roaringwater Bay to Carnsore Point) ranged from 16,927 (95% CI's 11,587 – 24,728) in summer 2021, 15,146 (95% CI's 10,768 – 21,304) in summer 2022 and 23,935 (95% CI's 17,471 – 32,789) in winter 2022. The shallow, tidal nature of Lough Mahon and River Lee does not represent typical habitat for the species, and the area is not considered to support important life-history functions such as feeding aggregations, breeding or calving.

3.3. Common bottlenose dolphin (*Tursiops truncatus*)

Common bottlenose dolphins are one of the most studied delphinid species and are widely distributed in both temperate and tropical marine waters worldwide with the species currently classified as Least Concern on the IUCN Red List (Wells and Scott, 2009; Wells *et al*., 2019). Bottlenose dolphins are among the most commonly recorded cetaceans in Irish waters (NPWS, 2019), where they are observed year-round. This species is listed on Annex II and Annex IV of the Habitats Directive. Annex II requires Member States to designate Special Areas of Conservation (SACs) for the species where appropriate, while Annex IV affords strict protection to individuals throughout their natural range. There are ten SAC's designated for this QI in Ireland.

At least three genetically distinct populations occur in the waters off the west coast of Ireland including the resident group from the Shannon Estuary of which a small group of individuals (*c.* 8) utilise outer Cork Harbour, a more mobile population moving along the west coast referred to as the Connemara-Mayo-Donegal population and a less defined more oceanic population primarily represented by stranded animals (Rogan *et al*., 2018). Large-scale movements reported for dolphins occurring between the west, south, and east coasts of Ireland indicate that dolphins outside the Shannon Estuary are more transient and mobile.

Records from the National Biodiversity Data Centre (NBDC) indicate that bottlenose dolphins are infrequently recorded in Lough Mahon and the River Lee, likely reflecting the shallow, tidal nature of the area that is not optimal for cetacean foraging/behaviours.

The nearest NBDC recorded sightings of bottlenose dolphin to the proposed MUL area is from Pope's Quay approximately 2.5 km away, recorded in 2021. Lough Mahon and the River Lee does not support a Special Area of Conservation (SAC) designated for bottlenose dolphin, and no areas within the inner harbour are known to be of particular importance for the species. The nearest SAC for which bottlenose dolphin is a qualifying interest is Hook Head SAC [000764], located approximately 107 km from the proposed Project. There are no

other SACs designated for the species along the south coast, however Belgica Mound Province SAC is an offshore SAC to the east north-east of the proposed Project and is approximately 222 km from it. Given the tidal, shallow nature Lough Mahon and the River Lee, the Project area is considered largely unsuitable for bottlenose dolphin use. As a result, the occurrence of bottlenose dolphins in proximity to the Project area is considered unlikely, with any presence within the wider area expected to be occasional and transient.

Compared to areas such as the Shannon Estuary or the west coast of Ireland, sightings are infrequent. While a small resident population is present in Cork Harbour, the area relates to the outer harbour and not Lough Mahon where the proposed Project is located. Where present, individuals are considered likely to be transient, as the shallow, tidal nature of Lough Mahon and River Lee does not represent typical habitat for the species, and the area is not considered to support important life-history functions such as feeding aggregations, breeding or calving.

The coastal and offshore waters of Ireland provide some of the most important habitats for cetaceans in Europe (O'Brien *et al.,* 2009). In 2005, Small Cetaceans in the European Atlantic and North Sea project (SCANS-II) carried out shipboard and aerial surveys to estimate cetacean abundance in the continental shelf waters in the Northeast Atlantic. A total abundance of 313 individuals (CV = 0.81) was calculated around the coast of Ireland (Hammond *et al.,* 2013). Ingram *et al*. (2009) assessed abundance estimates of bottlenose dolphin in the west coast of Ireland (total of 171 ± 48 (CV = 0.28, 95% CI = 100 -294)), however they also stated that animals recorded in this study were present beyond the survey area, with sightings around Youghal, Co. Cork and in Co. Donegal. During the ObSERVE Phase II (2021-2022) programme (Giralt Paradell *et al*., 2024), abundance estimates were generated for bottlenose dolphins using design-based and model-based approaches. No sightings occurred in coastal waters off the south coast (Stratum 6C (Roaringwater Bay to Carnsore Point)).

3.4. Killer whale (*Orcinus orca*)

Killer whale (*Orcinus orca*) have been occasionally recorded in Cork Harbour, including a sighting in 2001 where two female individuals travelled upriver as far as Horgan's Quay. This is considered an unusual and infrequent occurrence. The desktop review did not identify any more recent records within Lough Mahon/River Lee or the proposed project area. On this basis, killer whale are not considered a likely receptor within the receiving environment for the purposes of this assessment.

3.5. Harbour (common) porpoise (*Phocoena phocoena*)

Harbour (common) porpoise (*Phocoena phocoena*) has been recorded within the general Lough Mahon area through a single stranding record near the Jack Lynch Tunnel (N40). This represents the only identified record

upriver from Cork Harbour within Lough Mahon (*i.e.,* proximity to the proposed MUL area). On this basis, harbour porpoise is not considered a likely receptor within the receiving environment for the purposes of this assessment.

3.6. Marine Turtles

The most up-to-date information on marine turtle distribution in Ireland is available from the National Biodiversity Data Centre (NBDC, 2025), specifically through the *Irish Marine Turtle Records* dataset (last updated 8 May 2025). This dataset contains validated sightings, strandings, and captures from 1884 to 2023, contributed by researchers, citizen scientists, and verified expert observations. Records are dominated by the leatherback turtle (*Dermochelys coriacea*). The loggerhead turtle (*Caretta caretta*) is also recorded, albeit far less frequently, with the most recent validated occurrence in November 2023. Occasional records also exist for other species such as the Green Turtle (*Chelonia mydas*), Hawksbill Turtle (*Eretmochelys imbricata*), and Kemp's Ridley (*Lepidochelys kempii*), though these are considered exceptional vagrants. The NBDC dataset integrates historic literature records (King and Berrow, 2009) with modern verified submissions, ensuring a comprehensive record of turtle presence in Irish waters.

The leatherback turtle is the most frequently recorded marine turtle species in Irish waters (King & Berrow, 2009) and has a wide distribution in temperate waters during the summer and autumn months (Houghton *et al.,* 2006). The species is strictly protected under Annexes II and IV of the Habitats Directive, requiring Member States to designate Special Areas of Conservation (SACs) where appropriate. The loggerhead turtle is the second most frequently recorded marine turtle species in Irish waters (King & Berrow, 2009). This species has a wide distribution across temperate and tropical regions of the Atlantic, Pacific, and Indian oceans and is strictly protected under Annexes II and IV of the Habitats Directive, requiring Member States to designate Special Areas of Conservation (SACs) where appropriate.

Overall, marine turtle records in Ireland are most frequent along the south coast and off headlands in west Cork, which together account for 41.5% of all records. The distribution of marine turtle records by county in Ireland is presented in **Table 3-2**.

Table 3-2: Distribution of turtle species logged around Ireland, adapted from Table-2 King & Berrow (2009). The proposed site investigation surveys are along the Co. Cork coast, highlighted in bold.

County/Sea	Turtle species				
	Leatherback	Loggerhead	Kemp's Ridley	Hawksbill	Green
Derry	4	1	0	0	0
Antrim	10	0	0	0	0
Down	12	0	0	0	0
Louth	3	0	0	0	0
Dublin	10	1	1	0	0
Wicklow	4	0	0	0	0
Wexford	25	1	0	0	0
Waterford	63	3	0	0	0
Cork	**378**	**12**	**1**	**1**	**1**
Kerry	113	15	2	0	0
Clare	18	3	1	0	0
Galway	21	11	2	0	0
Mayo	49	5	1	0	0
Sligo	14	2	0	0	0
Leitrim	1	0	0	0	0
Donegal	109	2	2	0	0
Celtic Sea	9	0	0	0	0
Irish Sea	4	0	0	0	0
Offshore	16	0	0	0	0
Total	**863**	**56**	**10**	**1**	**1**

Marine turtles have not been recorded in Lough Mahon or the River Lee (NBDC). These waters comprise a shallow, strongly tidal transitional system and do not represent typical habitat for marine turtle species, which are generally associated with offshore and coastal marine environments. Any occurrence within the Project area would therefore be considered highly unlikely and exceptional.

On this basis, while marine turtles are included in this assessment as Annex IV species, the proposed site investigation surveys are not expected to give rise to significant disturbance, injury or mortality, nor to adversely affect the conservation status of any marine turtle species. No credible impact pathway has been identified by which the proposed surveys could result in a breach of the strict protection provisions of Article 12 of the Habitats Directive.

3.7. Bats

There are nine species of bat established in Ireland (Roche et al., 2014; Aughney, 2022), all of which are protected under Annex IV of the Habitats Directive. Records from the National Biodiversity Data Centre (NBDC) confirm the presence of several bat species within the wider Cork area, including common pipistrelle

(*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Leisler's bat (*Nyctalus leisleri*), Daubenton's bat (*Myotis daubentonii*) and brown long-eared bat (*Plecotus auritus*) (NBDC, 2026). Lesser horseshoe bat (*Rhinolophus hipposideros*) has also been recorded infrequently on the western outskirts of Cork City. These species are generally associated with habitats such as woodland edges, hedgerows, watercourses and built structures. No NBDC records were identified within the proposed Project area or Docklands, although records are present in the wider surrounding area.

The proposed site investigation surveys are confined to marine, intertidal and quay wall environments within the lower River Lee estuary. The surveys comprise short-duration vessel activity, intertidal ecological and archaeological surveys, benthic grab sampling using small hand-deployed equipment and structural inspection works. No tree removal, vegetation clearance, building demolition or permanent alteration of buildings is proposed. The North Quays structural surveys relate to existing quay wall structures and will be temporary and localised. Above-water inspection and localised intrusive testing may occur, but the works will not involve widespread removal, demolition or sealing of structural joints, cracks or voids.

The proposed site investigation surveys are confined to marine, intertidal and quay wall environments within the lower River Lee estuary. The additional North Quays structural surveys will be temporary and localised and may include above-water inspection and minor intrusive testing of existing quay wall structures. No tree removal, vegetation clearance, building demolition or permanent alteration of buildings is proposed.

The North Quays surveys are expected to be undertaken during daytime working hours, with the potential for temporary lighting currently proposed within the survey scope. In the absence of nocturnal works or artificial lighting, no significant disturbance pathway to bats commuting or foraging along the River Lee corridor is identified. The precise above-water intrusive investigation locations will be determined by the appointed Structural Surveyor, and intrusive works will be confined to the survey elements described in the application. On this basis, the proposed surveys are not expected to result in injury or deliberate disturbance to bats, or in the deterioration or destruction of bat breeding or resting sites.

3.8. Other (Non-Annex IV) Species

The species included in this section are:

- Harbour seal (*Phoca vitulina*) [1365]
- Grey seal (*Halichoerus grypus*) [1364]
- Basking shark (*Cetorhinus maximus*)

Although these species are not listed in Annex IV of the Habitats Directive, they are known for their foraging range which makes them a potential species to occur in the Project area. An overview of the distribution abundance of these species is summarised in the **Section 0**through **Section 3.8.3**.

3.8.1. Harbour seal (*Phoca vitulina*)

Harbour seals (also referred to as common seals) are semi-aquatic marine mammal from the Pinnipeds group with a wide distribution in the northern hemisphere (Cronin *et al.,* 2007). Harbour seals are one of two seal species that are indigenous to Irish waters, predominantly on the west coast of Ireland. This species is listed on Annex II of the Habitats Directive, which requires Member States to designate Special Areas of Conservation (SACs) for its protection where appropriate. There are 13 SACs designated for this species in Ireland. The closest SAC's designated for this species are Glengarriff Harbour and Woodland SAC [000090] and Kenmare River SAC [002158], approximately 200 km from the proposed Project. Harbour seal

In Ireland, harbour seals are most abundant along the west and north-west coasts, with smaller and more scattered populations occurring along the east coast (Cronin *et al.,* 2007; Morris & Duck, 2019). Records from the NBDC indicate that harbour seals are occasionally recorded within Lough Mahon and the River Lee. While records are present, they do not indicate substantial habitat use or that this is a key habitat for common seal. Individuals are likely to be transient or seasonal visitors using the area for foraging.

Morris and Duck (2019) carried out thermal-imaging surveys along the coastline of Ireland in August 2017 and August 2018, which also compiled the counts of harbour seals from surveys in 2003, in 2011/2012 and in 2017/2018. Lough Mahon and Cork Harbour are within South-west, Area 2 (Cape Clear Island to Dundeady Island Headland) where 52 harbour seals were recorded in 2003, 88 in 2011/2012, and 115 in 2017/2018 (see **Table 3-3**).

While harbour seals may occasionally be present in the area for foraging, Lough Mahon and the River Lee do not support key habitat features for this species. The intertidal habitats within the area, while present, are heavily influenced by tidal regimes and human activity, and are not considered to represent key resting or breeding areas for the species. Harbour seals using the wider area are therefore expected to occur at low densities and on a non-resident basis.

The survey activities may result in the temporary presence of vessels and personnel within the lower estuary but will not involve any physical disturbance to haul-out sites or breeding habitat, as none are present. No piling, dredging or high-intensity noise-generating activities will occur. Any interaction between harbour seals and the proposed site investigation surveys are expected to be limited to short-term behavioural responses, such as brief avoidance of vessels or sampling locations. Harbour seals are known to exhibit a degree of

tolerance to routine vessel traffic in coastal environments, and any disturbance would be localised, temporary and fully reversible. There is no pathway for injury, significant disturbance or displacement from important habitat. Despite this, reflecting the local known presence of harbour seal in the area supported by data from NBDC, mitigation measures will be considered to minimise any potential disturbance to local pinniped species.

Table 3-3: Count of harbour in the south-west region of Ireland, from surveys in 2003, 2011/2012 and 2017/2018, extracted from Table 1. in Morris and Duck (2019). Area 2 (Cape Clear Island to Dundeady Island Headland) which overlaps the proposed site is highlighted in bold.

Region	Area	Harbour seals		
		2003	2011/2012	2017/2018
South-west	1	10	0	5
	2	**52**	**88**	**115**
	3	422	363	393
	4	399	345	441
	5	36	90	131
	6	0	1	11
	7	8	1	4

3.8.2. Grey seal (*Halichoerus grypus*)

Grey seals are the other seal species to inhabit the coast of Ireland, with greatest numbers around the western coast. This species is listed on Annex II of the Habitats Directive, which requires Member States to designate Special Areas of Conservation (SACs) for its protection where appropriate. There are 10 SACs designated for this species in Ireland; however, there are no SACs designated for this species within or in close proximity to the proposed site investigation surveys. The closest significant SAC supporting grey seals is Roaringwater Bay and Islands SAC [000101] and Saltee Islands SAC [000707] approximately 120 km and 140 km away, respectively, from the proposed Project.

Thermal imaging aerial surveys carried out by Duck and Morris (2012) in 2011 and by Morris and Duck (2019) in 2017–2018 indicate that that while grey seals are regularly recorded along the broader Cork coastline, Lough Mahon does not support any major haul-out or breeding sites. In 2011/12 and 2017/18, 198 and 411 grey seals were recorded, respectively, within South-west Area 2 (Cape Clear Island to Dundeady Island Headland). Records on the NBDC indicate that the species may occasionally traverse past the proposed Project area to forage upriver in the River Lee.

Grey seals are therefore likely to occur within the vicinity of the proposed Project area only on a transient basis, moving through the area while foraging up the river. These counts of grey seals in the Irish South-west region are provided in **Table 3-4** where Area 2 includes the Project area. It can be concluded there is no pathway for injury, significant disturbance or displacement from important habitat. Despite this, reflecting the

local known presence of grey seal in the area supported by data from NBDC, mitigation measures will be considered to minimise any potential disturbance to local pinniped species.

Table 3-4: Count of grey seals in the South-west region of Ireland, from surveys in 2003, 2011/2012 and 2017/2018, extracted from Table 1. in Morris and Duck (2019). in Morris and Duck (2019). Area 2 (Cape Clear Island to Dundeady Island Headland) which overlaps the proposed site is highlighted in bold.

Region	Area	Grey seals		
		2003	2011/2012	2017/2018
East	1	13	28	46
	2	**58**	**198**	**411**
	3	10	55	88
	4	8	11	12
	5	2	11	12
	6	45	150	222
	7	2	0	1

3.8.3. Basking Shark (*Cetorhinus maximus*)

Basking sharks are the second-largest fish species, most frequently sighted between April and September in shallow coastal areas in the northern Atlantic (Doherty *et al.,* 2017). Basking sharks are protected under Section 23(2)(a) of the Irish Wildlife Act 1976, entitled the "Wildlife Act 1976 (Protection of Wild Animals) Regulations 2022", making it an offense to hunt, injure, or disrupt their breeding and resting sites. They are listed under international legislation, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the United Nations Convention on the Law of the Sea and they are also listed in the International Union for Conservation of Nature (IUCN) Red List, classified as endangered in 2019.

Due to their primary prey (zooplankton), basking shark abundance peaks have been shown to be positively correlated with peaks in plankton density, which can explain this species abundance during summer months (Sims and Quayle, 1998). Previous literature suggests that basking sharks go through extensive migrations from September to May (Doherty *et al.,* 2017), as an alternative to hibernation periods (Parker and Boseman, 1954). Although their distribution patterns have been widely studied around Ireland and UK waters, their abundance and density estimations have not yet been assessed (Sims, 2008

Records from the National Biodiversity Data Centre (NBDC, 2026) indicate that basking shark may occur infrequently within Cork Harbour; however, there are no records from Lough Mahon or the River Lee. Basking sharks are predominantly coastal and offshore in distribution and are typically associated with areas of elevated

zooplankton productivity in open or semi-open marine waters. The shallow, strongly tidal and semi-enclosed nature of Lough Mahon does not represent optimal or preferred habitat for this species.

On this basis, while basking shark is considered in this assessment due to its protected status, the proposed site investigation surveys are not expected to give rise to significant disturbance, injury or mortality, nor to adversely affect the conservation status of the species. No credible impact pathway has been identified by which the proposed surveys could result in significant interaction with, or adverse effects on, basking shark.

4. Potential Impact Mechanisms

A detailed description of the proposed project is provided in **Section** Error! Reference source not found. above. Given the nature of the proposed project, the potential impact mechanisms identified to potentially have an impact on Annex IV species in the proposed project area are examined below.

The risk of an accidental pollution event was also considered during the assessment. Due to the small-scale surveys, vessels and localised structural investigation works involved, it is not considered likely that the proposed surveys will give rise to a pollution event, provided standard environmental controls are implemented. This includes measures to prevent the discharge of hydraulic oil, fuel, concrete debris, cutting water or other contaminants to the water environment, and the disposal of waste, including concrete core spoil and cutting water, in accordance with applicable waste management requirements.

4.1. Potential Impact Mechanism 1: Visual Disturbance from Survey Activity

The operation of survey vessels during the geophysical surveys has the potential to generate visual disturbance within the immediate vicinity of the surveys. The presence and movement of vessels may affect sensitive marine fauna, including marine mammals and otter, through temporary behavioural responses such as avoidance or short-term displacement. Vessel-generated noise will be low-frequency and low-intensity, and comparable to existing background noise associated with routine vessel traffic within Cork Harbour. Cork Harbour, the Lee River and Estuary, and Lough Mahon are areas of high vessel traffic. The main navigational channel and associated berths are maintained through dredging to permit safe vessel movement into and out of Cork, the responsibility of the Port of Cork, as specified under the required licencing. Furthermore, the area undergoes high vessel activity including cargo, dredging/underwater operations, passenger and pleasure (including sailing), tug and towing, tanker, high speed craft, and fishing (EMODnet Map Viewer, 2024). Any noise-related effects would therefore occur within a region characterised by medium-high level vessel traffic. Disturbance will be localised, temporary, and restricted to the duration of the survey operations with no mechanism by which effects could extend beyond the immediate footprint of the surveys.

Visual disturbance may also arise from the North Quays structural survey works, including quay-edge and land-based personnel presence, diver-support activity, vessel-based inspection and temporary activity at existing quay wall structures. These works will be temporary, localised and undertaken within an already urbanised and disturbed Docklands environment. No piling, dredging, demolition, reclamation or construction works are proposed.

For Annex IV species, including otter, bottlenose dolphin, and common dolphin, physical disturbance may result in brief, low-level behavioural responses to vessel presence or movement. Any such responses are

expected to be non-injurious, short-lived, and similar in nature to those elicited by routine vessel activity within Cork Harbour and the River Lee. There is no plausible mechanism by which short-duration avoidance behaviour within the limited survey footprint could reduce foraging efficiency, alter movement patterns, or result in significant disturbance to marine mammals as defined under Article 12 of the Habitats Directive. Furthermore, given the shallow, tidal nature of the MUL area and its limited suitability for cetaceans, interaction with these species is expected to be infrequent overall.

Otter likely use the intertidal areas in the vicinity of the docklands and along the River Lee, however the individuals in these locations are likely to be habituated to regular human presence, given the ongoing maritime and port-related activities in the area. In addition, surveys are carried out during daytime, which largely avoids sensitive periods for otter. Otter are likely to occasionally overlap the surveys both spatially and temporally due to the high level of otter activity in the overall Cork City region, however any potential disturbance is expected to be limited to avoidance behaviour or short-term displacement. No holts or other key otter habitat have been identified in the area. An otter survey will be undertaken as part of the scope of the MUL to confirm the presence or absence of any potential otter habitats. Ecological surveys, including the otter survey, will precede the archaeological and structural surveys. As the surveys are temporary, no disturbance of ecological function or protected features is expected to occur. The proposed site investigation surveys are also proportionate, short in duration, and targeted, ensuring that any potential disturbance is entirely reversible.

Physical disturbance associated with site investigation surveys will be further limited through the application of standard best-practice operational procedures, including careful vessel manoeuvring and adherence to established marine environmental protection measures. Vessels will follow predictable routes at regulated speeds consistent with existing activity in Cork Harbour and the River Lee. While these measures further reduce the already low magnitude of disturbance, they are not required to avoid significant effects.

Based on the small and temporary footprint of the proposed Project, the localised nature of all potential interactions, and the existing baseline of vessel and commercial activity within Cork, the proposed site investigation surveys will not result in injury, significant disturbance, or the deterioration or destruction of breeding or resting sites for any Annex IV species.

4.2. Potential Impact Mechanism 2: Underwater Noise Disturbance

Marine mammals rely on sound to navigate, communicate, and sense and interpret their surroundings. If the frequency of anthropogenic noise overlaps with the frequencies used by marine mammals, this may reduce the animal's ability to detect important sounds for navigation, communication and prey detection (Weilgart, 2007). This is termed acoustic masking, which may occur anywhere within an organism's auditory range (Wright *et al.,* 2007; Richardson *et al.,* 1995). Masking of important vocalisations will result in increasing information ambiguity and, in extreme circumstances, may result in cetaceans being unable to orientate themselves or hunt/evade predation in the marine environment (Wright *et al.* 2007).

Southall *et al*. (2008) has categorised seals and cetaceans into five functional groups based on several laboratory studies, audiometric data and through comparisons of anatomy. It functionally group's cetaceans in relation to their known auditory ability and functional frequencies, whilst all pinniped species were assessed based on their auditory ability in air as well as their auditory ability in water. Details of the frequency abilities of cetaceans and pinnipeds are included in **Table 4-1** below. While all functional hearing groups are included for completeness, only dolphin species (mid-frequency cetaceans) are considered relevant to this assessment, as these are the only cetaceans that may occasionally occur within the survey area on a transient basis. There are no criteria to assess the significance of underwater noise on the Eurasian otter however it is thought they are similar to those of pinnipeds (Ghoul & Reichmuth, 2014) and are assessed as such moving forward. Furthermore, otters (*Lutra lutra*) spend 75% of their lives on land. They can be relatively tolerant of disturbance and adjust to circumstances. They are often present in urban areas with considerable human activity nearby, as has been well documented in Cork City itself as described in **section 3.1**.

Table 4-1: Functional frequencies of various cetaceans and pinnipeds found in Irish waters (adapted from Southall *et al.* (2007)).

Cetaceans			Pinnipeds (in water)	Pinnipeds (in air)
Low Frequency (7 Hz-22 kHz)	**Mid-frequency (150 Hz-160 kHz)**	**High Frequency (200 Hz-180 kHz)**	**All species (50Hz - 86 kHz)**	**All species (75 Hz – 30 kHz)**
Baleen whales	Most toothed whales, dolphins	Certain toothed whales, porpoises	All species	All species
Species Recorded in Irish Waters				
Humpback whale Blue whale Fin whale Sei whale Minke whale	Sperm whale Killer whale Long-finned pilot whale Beaked whale species Dolphin species	Pygmy sperm whale Harbour porpoise	Grey seal Harbour seal	Grey seal Harbour seal

Underwater noise generated from bathymetric surveys, archaeological surveys, diver-support activity, sonar / echo sounding and other in-water structural survey equipment may interact with cetaceans and/or otter and may result in temporary displacement or altered behaviour; consequently, relevant Annex IV species are examined in further detail in this report. The estimated operational frequency of indicative bathymetric survey equipment proposed for site investigation surveys are provided in **Table 4-2**, where available.

Table 4-2: Indicative bathymetric survey equipment.

Equipment	Estimated Operational Frequency	Indicative Type
Side scan sonar	410/500 kHz/600-1200 kHz	N/A
Magnetometer	N/A	N/A
Multibeam echosounder	200 – 450 kHz/700 kHz	R2 Sonic 2020 Multibeam echosounder and R2 SIM, or equivalent
Sub-bottom profiler	Typically between 2 – 16 kHz	Chirp system preferred

Based on the mid-frequency cetacean functional hearing group (representative of dolphin species) and pinnipeds in water (used as a precautionary proxy for otter hearing sensitivity due to the limited availability of species-specific audiograms), the approximate hearing ranges are 150 Hz–160 kHz and 50 Hz–86 kHz, respectively. The majority of the proposed survey equipment operates outside the most sensitive hearing ranges of these groups. The sub-bottom profiler (SBP) may operate within part of the audible range for dolphins and otter; however, several characteristics of this equipment substantially limit the potential for impact. SBPs used for site investigation surveys typically operate at low source levels, produce a highly directional downward-focused acoustic beam, and emit very short pulses. Consequently, for an animal to experience the highest sound levels it would need to be positioned directly beneath the transducer. Sound levels attenuate rapidly away from the beam axis, and the duration of exposure is extremely brief. On this basis, the risk of auditory injury or significant disturbance to marine mammals from SBP operation is considered negligible.

While auditory injury is therefore considered unlikely, the surveys are also assessed in terms of any potential behavioural responses (*e.g.,* short-term avoidance), which would be expected to be localised, temporary and fully reversible. While short-beaked common dolphin and common bottlenose dolphin may very occasionally transit through the proposed MUL area, the site investigation surveys will be brief in duration and limited in spatial extent. For an interaction to occur between survey-related underwater noise and a cetacean, an individual/small group would need to be present within the area at the same time as the survey activity and within a distance at which the sound source could elicit a behavioural or auditory response. Given the very limited number of recorded observations of cetaceans within Lough Mahon and the lower River Lee, the probability of such spatial and temporal overlap occurring during the brief survey window is considered extremely low. The likelihood of any interaction between marine mammals and survey-related underwater noise is therefore considered remote. Any potential effects would be limited to individual animals and would be restricted to temporary avoidance behaviour, comparable to responses to visual disturbance, assessed in **Section 4.1** above.

Otter may be present within the wider area; however, the risk of impact from underwater noise is considered very low, however they may display avoidance during drilling associated with structural surveys. Otters spend a substantial proportion of their time above water (approximately 75%), and the operational frequencies of most survey equipment fall largely outside the hearing range assumed for otter based on the pinniped proxy. Any potential response would most likely be limited to short-term behavioural avoidance, comparable to responses to visual disturbance, assessed in **Section 4.1.**

Based on the small and temporary footprint of the proposed Project, the localised nature of all potential interactions, and the low-level impact of the potential sources, the proposed site investigation surveys will not

result in injury, significant disturbance, or the deterioration or destruction of breeding or resting sites for any Annex IV species.

The additional North Quays structural survey works may generate temporary and localised underwater or above-water noise associated with diver-support activity, vessel-based inspection, sonar / echo sounding where required, and localised coring, drilling or chipping where required for material testing. These activities will be limited in duration and spatial extent and will be substantially lower in intensity than high-energy impulsive activities such as piling or blasting, which are not proposed. Any disturbance response by Annex IV species would be expected to be limited to brief avoidance of the immediate works area.

5. Risk Assessment

A number of Annex IV species and other protected marine fauna may occur in or near the proposed project, either on a resident, transient, or occasional basis. These include the species listed in **Section 3**.

The potential for significant effects on these species from the proposed site investigation surveys, including the additional Cork North Docks / North Quays structural survey works, has been considered in relation to two primary impact mechanisms: underwater noise and visual disturbance from vessel activity, diver-support activity, quay-edge personnel and other temporary survey activity. Given the localised footprint of the site, the small scale of activities, and the existing baseline of maritime and urban activity ongoing in the region, any effects are expected to be minor, highly localised, and reversible. Mobile species such as cetaceans, seals and otter are capable of avoiding the immediate survey area and are unlikely to experience sustained displacement or population-level effects. More site-associated species, such as otter utilising the area, are generally tolerant of localised human and vessel activity, particularly in a high-activity region such as the MUL area.

While there is potential for localised disturbance, the overall risk to Annex IV species from the proposed site investigation surveys is considered to be low. No significant adverse effects on the conservation status of these species are anticipated. A summary risk assessment of the potential impacts for Annex IV species is provided in **Table 5-1**.

Table 5-1: Annex IV Risk Assessment.

Species/Group	Noise Disturbance	Visual Disturbance from Vessel / Survey Activity	Impact Assessment
Common dolphin	Low	Low	Wide-ranging, highly mobile species. May exhibit brief, localised avoidance of vessels but will readily return once activity ceases.
Harbour porpoise	Neg	Neg	Unlikely to occur in the MUL area. No risk of sustained displacement or disturbance.
Bottlenose dolphin	Low	Low	Wide-ranging, highly mobile species. Unlikely to occur in MUL area. May exhibit brief, localised avoidance of vessels but will readily return once activity ceases.
Killer whale	Neg	Neg	Unlikely to occur in the MUL area. No risk of sustained displacement or disturbance.
Grey & harbour seals	Neg	Neg	No haul-outs or breeding sites are present within the proposed MUL area. Transient individuals may briefly avoid vessels, diver-support activity or other temporary survey activity, but effects would be localised and reversible. No population-level effects or sustained displacement are anticipated.
Larger whales (*e.g.* minke, fin, humpback)	Neg	Neg	Occasionally recorded further offshore of County Cork; unlikely to occur in the MUL area. No risk of sustained displacement or disturbance.
Basking shark	Neg	Neg	Unlikely to occur in the MUL area. No risk of sustained displacement or disturbance.
Marine turtles	Neg	Neg	Very rare inshore occurrence. No realistic pathway for exposure to proposed site investigation surveys.
Otter	Low	Low-Medium	May use intertidal areas around the Docklands, River Lee and shore-based piers for foraging, commuting and/or resting. The area is used regularly for maritime and urban activity, indicating a degree of habituation for otter using these areas. Any disturbance from vessel activity, quay-edge personnel, diver-support activity or localised structural survey works would be temporary and localised and would not affect commuting, foraging or breeding behaviour.

Bats	Neg	Neg	No tree removal, vegetation clearance or building demolition is proposed. The additional North Quays works relate to temporary and localised inspection and testing of existing quay wall structures. Preliminary inspection will identify any crevices, voids or structural features with potential to support roosting bats, and any such feature will be reviewed by a suitably qualified ecologist before intrusive investigation proceeds. No injury, significant disturbance or deterioration or destruction of breeding or resting sites is anticipated.

6. Suggested Mitigation

To minimise potential impacts on Annex IV species, the following measures will be implemented as part of the site activities; however, these measures reduce the already low likelihood of an impact being realised. These measures will apply to both the original Cork Docklands South Quays survey activities and the additional Cork North Docks / North Quays structural survey works, where relevant. Measures will be applied in line with relevant best practice including NPWS (2014) guidance on managing risk to marine mammals from sound, standard marine survey protocols and MARA's guidance note for licence holders on marine mammal and bird observations during licenced activities at sea:

- As specified in **section 3.1**, an otter survey is proposed to confirm the presence or absence of any potential otter habitats. Ecological surveys, including the otter survey, will precede the archaeological and structural surveys.
- A suitably qualified Marine Mammal Observer (MMO) will be appointed for periods when vessel based MBES, SSS and bathymetric surveying is being undertaken.
- The MMO will carry out a 30-minute pre-start visual watch within a 500 m Monitoring Zone. If any marine mammal is present, commencement of survey activity will be delayed until the animal has left the zone, or until a 30-minute clearance period passes without further sightings.
- A soft start (ramp-up) procedure will be used where possible, gradually increasing acoustic output over 20 - 40 minutes to allow animals time to move away.
- Survey operations will only commence during daylight hours when effective visual monitoring can be ensured.
- If MBES survey activity stops for more than 30 minutes, the pre-start monitoring procedure will be repeated before recommencing.
- Vessel speeds will be minimised (<6 knots where practicable) within the survey area to reduce collision risk and underwater noise from engine/propeller cavitation.
- Clear communication procedures will be maintained between the MMO and survey crew to ensure real-time decision-making on start-up, shutdown, and resumption of works.
- North Quays structural survey activity, including quay-edge access, diver-support activity and material testing, will be limited to the minimum area and duration required to complete the works safely and effectively.
- Measures will be implemented to prevent the discharge of hydraulic oil, fuel, concrete debris, cutting water or other contaminants to the water environment. Waste materials, including concrete core spoil and cutting water where generated, will be disposed of in accordance with applicable waste management requirements.

Once surveying has commenced and the pre- start procedures have been completed and cleared by the MMO, operations may continue at night or during poor visibility, as continuous activity is considered less disruptive than repeated start-ups.

Implementation of these measures will ensure that the risk of significant adverse effects on Annex IV species and other protected marine fauna is reduced to negligible levels, consistent with the requirements of the Habitats Directive.

7. Conclusion

This Annex IV Risk Assessment has considered the potential for noise disturbance and visual disturbance arising from the proposed site investigation surveys, including the additional Cork North Docks / North Quays structural survey works at Penrose Quay, Fishguard Wharf, Horgan's Quay, the Turning Basin and North Deep-Water Quay. The assessment has been undertaken with reference to the sensitivities and ecological requirements of Annex IV species known or likely to use the area, namely otter and, to a lesser degree, common dolphin and bottlenose dolphin.

The proposed MUL area occupies a small proportion of the lower River Lee estuary and activities will be largely confined to the site footprint. No documented resting or breeding sites for Annex IV species occur within the proposed MUL area. An otter survey will be undertaken as part of the proposed surveys to confirm the presence or absence of any such sites.

The additional North Quays structural survey works will be temporary, localised and investigative in nature and will not involve piling, dredging, demolition, reclamation or construction works. Above-water noise disturbance due to drilling, coring or other localised structural investigation activities may cause brief avoidance by otter. Underwater noise emissions are expected to be low intensity, short duration and rapidly attenuate. Behavioural responses by cetaceans, if they occur, would be brief, localised and fully reversible. There is no mechanism for sustained displacement, reduced foraging success or any population-relevant effect.

Physical disturbance from vessel activity, diver support activity, quay edge personnel and human presence during site investigation surveys is similarly confined to a very small point-source footprint. These effects will not result in habitat loss, deterioration of ecological functionality or permanent disruption of otter movement along the shoreline.

With the implementation of standard best-practice environmental protection measures, the project will avoid injury or significant disturbance to Annex IV cetaceans. No site activities will permanently affect otter resting or breeding sites and no significant disturbance is anticipated for otter foraging or commuting behaviour.

Based on the nature and scale of the proposed Marine Usage Licence, the mobility of the species concerned, and the limited spatial extent of potential disturbances, **no deliberate capture, killing, significant disturbance or deterioration of breeding/resting sites of Annex IV species is predicted**. Accordingly, the proposed project complies with the strict protection requirements of Article 12 of the Habitats Directive, and **a derogation licence under Regulation 54 is not required**.

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